CLAIMS

What is claimed is:

1. A propulsion device for a boat on water having an engine and a transom comprising:

(a) a support member of predetermined length and width and extending rearwardly from the transom;

(b) means for attaching a rudder assembly to the rearward end of said member:

(c) means to connect said member to said transom whereby said member may pivot vertically at said connections within a controlled predetermined range;

(d) an axle which is positioned in a horizontal manner and parallel to the transom and suitably machined so as to receive and position components mentioned within these claims and having a predetermined diameter and length;

(e) means to journal said axle at a predetermined point within said member;

(f) a rotatable blade support cylinder and contiguous internal hub of predetermined size;

(g) a bearing carrier conventionally attached to said cylinder and having conventional bearings and journalled upon said axle;

(h) means to connect in a pivotable manner a plurity of blades to the outer surface of said cylinder substantially parallel to the center axis of said cylinder;

(i) a plurity of articulated blades of a predetermined width, height, shape and profile; each said blade having a front and a back relative to the direction of said cylinder rotation and a contiguous actuating levers of predetermined length and mass conventionally attached to said blades and extending inward through a respective openings within the wall of said cylinder a predetermined distance;

(j) a friction reducing element suitably attached to the end of said levers;

(k) a load control cam of predetermined shape and size located within said cylinder and pivotably journalled on said axle such that the ends of said actuating levers and contiguous friction reducing elements can make contact with said cam at any point about the rotation of said cylinder; whereby the extended blade angle with a load applied is substantially a function of cam shape, and relative position of said cam;

(l) means to pivot said cam upon said axle a predetermined range;

(m) means to secure said cam, and bearings and contiguous carrier, upon said axle at a predetermined position;

(n) a shroud conventionally secured to said member and of size and shape to substantially cover said drive with an internal surface and structure having the longitudinal section appearance of a parabolic curve and constructed to contain airborne water accelerated in upward and forward radial directions by said drive;

(o) means to receive rotational energy from said engine and transfer said energy to said cylinder;

Whereby said energy of said engine causes the rotation of said support hub and said cylinder about said axle causing said blades to contact said water producing a thrust proportional to said energy; whereby said elevations of said member and the positions and shape of said cam influence said thrust.

2. The marine radial surface drive of claim 1 wherein the means to attach a rudder assembly is:

(a) conventional hinge and pin assemblies suitably configured at the rearward ends of said member;

(b) a hydraulic ram pivotally attached between said member and said rudder assembly whereby extending or contracting said ram causes the rudder assembly to pivot left and right in a conventional manner.

3. The marine radial surface drive of claim 1 wherein the means to connect said support member to said transom is:

(a) a right and left structural connection of predetermined width suitably arranged to allow a pivotal point on said transom to which said member is conventionally connected and can pivot vertically and is stable laterally;

(b) a pair of conventional hydraulic cylinder rams of predetermined size and force with one end suitably attached to said transom at a predetermined point above said structural connections and the other end of said rams suitably attached at a predetermined point on said member such that contracting or extending said rams in a conventional manner will alter the relative elevation of the rearward end of said member.

4. The marine radial surface drive of claim 1 wherein the means to support said axle at a predetermined point of said member is: an adjustable journal suitably recessed within the right and left side of said member whereby the fore and aft position of said axle can be adjusted within the limited range of said journal.

5. The marine radial surface drive of claim 1 wherein the means to connect said blades to the outer surface of said cylinder is:

(a) a plurity of interlocking hinges of predetermined size; a portion of said hinges forming a contiguous part of said blades and a portion of said hinges forming a contiguous part of said cylinder;

(b) a hinge pin of length substantially equaling the width of said blade and formed of stainless steel;

(c) a torsional spring integral to said hinge whereby said blades are held in a full extended position relative to the axis of said cylinder by the torsional force applied by said springs when said blade support cylinder is not rotating.

6. The marine radial surface drive of claim 1 wherein the means to pivot said cam upon said axle a predetermined range is: a hydraulic ram suitably connected between said cam and the left structural connection such that extending or contracting said ram in a conventional manner will pivot said cam a predetermined range.

7. The marine radial surface drive of claim 1 wherein the means to secure said cam and said carrier upon said axle at a predetermined position are conventional grooves machined into said axle such that conventional clips will be suitably accepted into said grooves in a conventional manner.

8. The marine radial surface drive of claim 1 wherein the means to receive rotational energy from said engine and transfer said energy to said cylinder is:

(a) a conventional coupling between said engine and said transmission; said transmission is conventionally mounted on the exterior side of said transom and supports a conventional drive shaft journalled into the right side structural support;

(b) a toothed drive pulley suitably doweled upon said drive shaft;

(c) a toothed pulley of a configuration matching said drive pulley and conventionally attached to said bearing carrier;

(d) a drive belt of a configuration matching said pulleys and conventionally connecting said drive pulley to said pulley whereby said energy of said engine conveyed through said transmission will rotate said drive pulley thus causing said belt to rotate said pulley thus causing said bearing carrier and said cylinder to rotate.

9. The marine radial surface drive of claim 5 wherein said friction reducing element at the end of said actuating lever is a roller bearing assembly of predetermined size suitably attached to said lever.

10. The marine radial surface drive of claim 5, further including a blade design comprising;

(a) a side profile comprising two separate and discrete concave features with respect to the front of said blades each said feature having a radius equal to about 1.5 times the height of said blade and a subtended angle of about 150 degrees; said features extend the full width of said blades;

(b) a top profile comprising a concave feature with respect to the front of said blades said feature having a radius equal to about 2.5 times the width of said blade and a subtended angle of about 170 degrees;

(c) a leading edge or edge opposite the said hinge having a convex curve shape and said edge being beveled towards the back of said blades; said bevel finished at about a 45 degree angle.

11. The marine radial surface drive of claim 1 wherein said blades and contiguous actuating levers are formed of stainless steel.

12. The marine radial surface drive of claim 1 wherein said support member, said cylinder, said cylinder support hub and said load cam are formed of aluminum.

13. A propulsion drive for a boat having a conventional engine suitably coupled to a conventional transmission conventionally mounted to the exterior of a conventional transom and said drive comprising:

(a) a support member extending rearwardly, operably connected to said transom of said boat with means for causing said member to pivot vertically within a controlled predetermined range;

(b) adjustable journals at a predetermined point of each side of said member to support a horizontal axle perpendicular to said transom;

(c) an axle of predetermined diameter and length with conventional grooves machined into said axle such that conventional clips will be suitably accepted into said grooves in a conventional manner and machine threaded portions at each end to receive a bolt;

(d) a rotatable blade support cylinder and contiguous internal hub of predetermined size;

(e) a plurity of articulated blades operably connected to said support cylinder; said blades of predetermined width, height, shape and profile;

(f) a load control cam of predetermined shape and size located on said axle within said cylinder and journalled upon said axle and fixed into position with said clips and

operably connected to said blades whereby the extended blade angle with a load applied is substantially a function of cam shape, and relative position of said cam.

(g) means to pivot said cam about said axle whereby the positions of said cam remains rigid during operation of said drive until intentionally adjusted;

(h) a bearing carrier with conventional bearings and conventionally attached to said cylinder and journalled upon said axle and fixed at a predetermined position upon said axle with said clips;

(i) a shroud conventionally secured to said member and of size and shape to substantially cover said drive with an internal surface and structure having the longitudinal section appearance of a parabolic curve and constructed to contain airborne water accelerated in upward and forward radial directions by said drive;

(j) a conventional rudder assembly pivotably attached on the rearward end of the support member with means to cause said assembly to pivot left and right a predetermined range;

(k) means to operably connect said drive to said transmission;

Whereby said energy of said engine causes the axial rotation of said bearing carrier and said cylinder about said axle causing said blades to contact said water producing a thrust proportional to said energy.

14. A marine radial surface drive of claim 13 further including said blades comprising:

(a) a front and a back relative to the direction of said cylinder rotation

(b) an integral actuating lever of predetermined length and mass attached to the back of said blade and extending inward through an opening within said cylinder wall a predetermined distance substantially at a right angle relative said profile of said blade whereby said blade angle without load applied, is substantially a function of a centrifugal force applied to said mass of said lever; a friction reducing element to suitably attached to the end of said lever and positioned to make contact with said cam;

(c) a side profile comprising two separate and discrete concave features with respect to the front of said blades each said feature having a radius equal to about 1.5 times the height of said blade and a subtended angle of about 150 degrees; said features extend the full width of said blades

(d) a top profile comprising a concave feature with respect to the front of said blades; said feature having a radius equal to about 2.5 times the width of said blade and a subtended angle of about 170 degrees.

(e) an interlocking hinge of predetermined size; a portion of said hinge forming a contiguous part of said blade and a matching portion of said hinge forming a contiguous part of the said cylinder whereby interlocking portions of said hinge are pivotably joined with a pin having a length substantially equal to width of said blade whereby said pin may be repeatedly and easily removed to facilitate a replacement of said blade

(f) a torsional spring integral to the hinge whereby said blade is held in a fully extended position relative to the axis of said cylinder by a torsional force applied by said spring when said drive is idle

(g) a leading edge or edge opposite the said hinge of said blade having a convex curve shape; and said edge being beveled towards the back of said blade; said bevel finished at about a 45 degree angle.

15. The marine radial surface drive of claim 13 wherein the means to cause said member to pivot vertically within a controlled predetermined range is: a pair of conventional hydraulic cylinder rams of predetermined size and force with one end suitably attached to said transom at a predetermined point above said structural connections and the other end of said rams suitably attached at a predetermined point on said member whereby contracting or extending said rams in a conventional manner will cause the rearward end of said member to raise or lower.

16. The marine radial surface drive of claim 13 wherein the means to cause said rudder assembly to pivot left and right a predetermined range is: a hydraulic ram pivotally attached between

said member and said assembly whereby extending or contracting said ram in a conventional manner causes the rudder assembly to pivot left and right in a conventional manner.

17. The marine radial surface drive of claim 13 wherein the means to receive rotational energy from said engine and transfer said energy to said cylinder is:

(a) a conventional coupling between said engine and said transmission; said transmission is conventionally mounted on the exterior side of said transom and supports a conventional drive shaft journalled into the right side structural support;

(b) a toothed drive pulley suitably doweled upon said drive shaft

(c) a toothed pulley of a configuration matching said drive pulley and conventionally attached to said bearing carrier;

(d) a drive belt of a configuration matching said pulleys and conventionally connecting said drive pulley to said pulley whereby said energy of said engine conveyed through said transmission will rotate said drive pulley thus causing said belt to rotate said pulley thus causing said bearing carrier and said cylinder to rotate.

18. A marine radial surface drive of claim 13 wherein the means to pivot said cam about said axle is:

(a) a brass insert bearing within the load cam such that said cam material is not in contact with said axle but is in contact with brass bearing;

(b) a hydraulic ram suitably connected between said cam and the left structural connection such that extending or contracting said ram will pivot said cam a predetermined range.

19. The marine radial surface drive of claim 13 wherein said blade and contiguous actuating lever are formed of stainless steel.

20. The marine radial surface drive of claim 13 wherein the support member, the blade support cylinder, cylinder support hub and load cam are formed of aluminum.